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REMARKS

Present Status of the Application

All pending claims 1, 3-7 and 11-13 were rejected under 35 U.S.C. 103(a) as being unpatentable over Sisson (US 4,107,364) in view of Collier IV (US 5,260,126).

In response, Applicants have further amended claims 1 and 11, added new claim 14 and submitted the following remarks that describe three features of independent claims 1, 11 & 14 and explain why they are non-obvious over the combination of Sisson and Collier. The amendment to claim 1 or 11, which is also recited in new claim 14, is supported by paragraphs **[0060]** and **[0062]** in the publication (US 2004/0067710) of this application. Reconsideration of claims 1, 3-7 and 11-13 as well as consideration of new claim 14 are respectfully requested.

Discussions of Rejections under 35 U.S.C. 103(a)

Independent claims 1, 11 and 14 recite at least three non-obvious features as follows.

Feature 1 is recited in claims 1, 11 and 14, being that *the long elastomeric fiber and the long nonelastomeric fiber are mixed together to form one layer of nonwoven fabric.*

Feature 2 is recited in claim 1, being *the inequality of "Bd/Ad≥25/18≈1.39"*, wherein Bd (Ad) is the average diameter of the long elastomeric (nonelastomeric) fiber.

Feature 3 is recited in claims 1, 11 and 14, being that *the long elastomeric fiber and long nonelastomeric fiber are manufactured with a melt-blowing or spunbonding method.*

The above three features and their non-obviousness are respectively discussed below.

I. Feature 1 and Its Non-obviousness

For at least the reasons set forth, Sisson or Collier fails to disclose, suggest or imply Feature 1, and it is non-obvious to combine corresponding parts in Sisson and Collier to obtain Feature 1.

A. Comparison between Sisson and Feature 1:

According to the specification and drawings of Sisson, Sisson discloses a multi-layer nonwoven fabric including a laminate of a layer of long nonelastomeric fibers and a layer of long elastomeric fibers, and a nonwoven fabric including one layer of the same long fibers of a mixture of a nonelastomeric resin and an elastomeric resin. In the former case, the long elastomeric fiber and long nonelastomeric fiber are not mixed together to form one layer of nonwoven fabric. In the latter case, there is no long elastomeric or nonelastomeric fiber but ***fibers each containing a mixture of a nonelastomeric resin and an elastomeric resin*** in the one layer of nonwoven fabric.

In the former case of Sisson, such as Example 1 described in cols. 15-17, a polyester (polyethylene terephthalate) is spun into a web of $12g/m^2$, and a polyurethane of polyester type is repeatedly spun to form a polyurethane web of $12g/m^2$ on the polyester wed and thus form a two-layer web. After another polyester web of $12g/m^2$ is formed on the two-layer web to form a three-layer unbonded web, the three layers are thermobonded with hot rolls.

Accordingly, the nonwoven fabric in Sisson's Example 1 has a three-layer structure that includes two polyester (nonelastomeric) webs and one polyurethane (elastomeric) web sandwiched between the two polyester (nonelastomeric) webs.

The latter case of Sisson's nonwoven fabric can be explained with the figures, especially Fig. 6. Sisson's apparatus in Fig. 6 includes filtering and homogenizing means 72/78 between the extruder 32/34 and the die head 36/38. After a nonelastomeric resin and an elastomeric resin are fed into the extruder 32/34, they are homogenously mixed by the filtering and homogenizing means 72/78 and then spun with the die head 36/38 to form a layer of the same fibers of an elastomeric/nonelastomeric resin mixture as one layer of nonwoven fabric, wherein no elastomeric fiber or nonelastomeric fiber is present but fibers of an elastomeric/nonelastomeric resin mixture.

In addition, according to the disclosed methods and apparatuses of Sisson, Sisson also suggests a nonwoven fabric as a laminate of a layer of (non)elastomeric fibers and a layer of the same fibers of an elastomeric/nonelastomeric resin mixture, and a nonwoven fabric as a laminate of two layers of fibers of different resin mixtures, etc. However, any of the single-layer structures and multi-layer structures of Sisson mentioned above is much different from the nonwoven fabric of claim 1 wherein a long elastomeric fiber and a long nonelastomeric fiber are ***mixed together*** to form one layer of nonwoven fabric.

B. Comparison between Collier and Feature 1:

Collier merely discloses a nonwoven fabric wherein ***short*** nonelastomeric fibers are mixed in a long elastomeric fiber matrix, but fails to disclose Feature 1. Collier's apparatus for manufacturing the nonwoven web is shown in Figs. 1 and 7, and the dies used are shown in Figs. 5 and 6.

In Collier's apparatus, as described in col. 10, line 3-col.11, line 38, an extrudable elastomeric composition is placed in a hopper 12, blended with an extruder 14, extruded to a die 16 and then spun with an orifice 20 formed on the die 16. Meantime, gas flows are introduced through the gas inlets 26 and 28 in the die 16 from the gas pipes 30 and 32 to contact with the filament stream in two narrow passageways or gaps 42 and 44 and blow out the filaments.

Accordingly, the die in Collier is only connected with the gas pipes 30 and 32 and a tube for delivering the blended resin from the extruder 14, while a die or delivery means allowing two different resins, e.g., an elastomeric resin and a nonelastomeric resin, to be spun individually is not disclosed or suggested in Collier. Therefore, it is impossible to form long elastomeric fibers and long nonelastomeric fibers at the same time with Collier's apparatus or method.

In addition, in the apparatus in Fig. 7 of Collier, nonelastomeric fibers 70 are cut by a picker roll 66 having many teeth 68, and the short nonelastomeric fibers 64 formed thereby are blown toward the elastomeric fiber stream 24 and dispersed therein to form a composite stream 96. To be readily blown by air and dispersed in the elastomeric fiber stream 24, the nonelastomeric fiber must be cut previously to form short fibers like staple fibers (col. 13, lines

34-35). Therefore, long nonelastomeric fibers cannot be used therein.

Moreover, according to the Markush-type description in col. 5, lines 3-7 or claim 14 of Collier that the nonwoven fabric may further include at least one type of nonelastic fiber and/or particulates, the above ***short*** nonelastic fibers act just like particulates in the elastic nonwoven fabric and are thus much different from ***long*** nonelastomeric fibers.

Furthermore, it is noted that ***none*** of the experiment examples of Collier includes short nonelastomeric fibers or particulates in the elastic nonwoven fabrics, so that even the properties of *an elastic nonwoven fabric with* ***short*** *nonelastomeric fibers mixed in long elastomeric fibers* are not clearly known.

C. Reasons that Feature 1 is no obvious modification of Sisson, Collier or the combination

(1) Feature 1 is no obvious modification of Sisson for at least the following reasons.

First, mixing a long nonelastomeric fiber with a long elastomeric fiber causes the nonelastomeric-fiber coverage ratio of the long elastomeric fiber lager than that in the above laminate-type nonwoven fabric of Sisson, which can be demonstrated by a simple stacking model. According to paragraphs **[0066]-[0067]** of the specification, a larger coverage ratio of the elastomeric fiber means a better anti-blocking property, so that Feature 1 surely makes the elastic nonwoven fabric of this invention have a better anti-blocking property than Sisson's laminate-type nonwoven fabric.

In addition, to be a usable nonwoven fabric, Sisson's laminate structures have to be heat-pressed such that the inter-layer bonding is achieved at least. However, the elasticity of

the polyurethane web is therefore adversely affected by the polyester web of low elasticity, so that the elasticity of the whole nonwoven fabric is insufficient in Sisson. As for the nonwoven fabric with Feature **1**, since a long elastomeric fiber and a long nonelastomeric fiber are entangled with each other to form a nonwoven fabric, the fibers are not required to be thermally bonded with each other so that the inherent elasticity of the long elastomeric fiber is retained.

Since Sisson does not identify the above anti-blocking issue and elasticity issue, in view of Sisson, one of ordinary skill in the art has no motivation to mix the long nonelastomeric fiber with the long elastomeric fiber.

According to MPEP §706.02(j), to establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some ***suggestion or motivation***, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Therefore, a *prima facie* case of obviousness cannot be established for Feature **1** based on Sisson.

(2) Feature 1 is no obvious modification of Collier for at least the following reasons.

Collier merely teaches to disperse short nonelastomeric fibers in a matrix of long elastomeric fibers, but provides no reason of doing so. It is also noted that no experiment example of Collier uses short nonelastomeric fibers. Therefore, in view of Collier, one of ordinary skill in the art even cannot recognize the effects of mixing ***short*** nonelastomeric

fibers in a matrix of long elastomeric fibers, not mentioning the effects of mixing ***long*** nonelastomeric fibers with long elastomeric fibers.

On the other hand, because Collier's nonwoven fabric is formed by dispersing short nonelastomeric fibers in a matrix of long elastomeric fibers, a thermal bonding treatment or an adhesive is ***necessarily*** required to prevent peeling of the short nonelastomeric fibers. Hence, as in the case of Sisson, the elasticity of Collier's elastomeric fibers is adversely affected lowering the elasticity of the whole nonwoven fabric.

Since Collier does not identify *any effect of mixing nonelastomeric fibers with elastomeric fibers* and the above elasticity issue, in view of Collier, one of ordinary skill in the art has no motivation to mix the long nonelastomeric fiber with the long elastomeric fiber. Therefore, a *prima facie* case of obviousness cannot be established for Feature 1 based on Collier according to MPEP §706.02(j).

(3) Feature 1 is no obvious modification of the combination of Sisson and Collier.

According to MPEP §2143.01 III, the mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination.

Since Sisson and Collier both fail to identify the above anti-blocking issue and elasticity issue, they do not suggest the desirability of the combination of the part of *mixing nonelastomeric fibers with elastomeric fibers* in Collier and the part of *using long*

nonelastomeric fibers in Sisson. Therefore, Feature 1 is non-obvious over the prior art at least according to MPEP §2143.01 III.

Moreover, Feature 1 cannot be obtained by directly combining Sisson with Collier, at least because

i) the apparatus and the methods used in Sisson can merely forms a laminate of layers of different fibers but cannot mix the long nonelastomeric fibers with the long elastomeric fibers, and

ii) the mixing apparatus and methods used in Collier can only mix long elastomeric fibers with short nonelastomeric fibers or mix short elastomeric fibers with long nonelastomeric fibers, ***but cannot form long elastomeric fibers and long nonelastomeric fibers simultaneously and mix them.***

II. Feature 2 (Bd/Ad≥25/18≈1.39) and Its Non-obviousness

Examiner asserted in Page 3 that the Bd/Ad ratio (ratio of the average diameter "Bd" of the long elastomeric fiber to the average diameter "Ad" of the long nonelastomeric fiber) in Sisson can be calculated from the deniers of the elastomeric fiber and the nonelastomeric fiber, 5.4 and 3.6 respectively, to be 1.5 (=5.4/3.6), which is within the range of "Bd/Ad≥ 25/18≈1.39". However, Applicants respectfully point out that ***the ratio of deniers is not equal to the ratio of average diameters.***

The denier of a fiber is defined as the weight in gram of the fiber in a length of 9000m, and is expressed by the following equation.

denier = $\pi R^2 \times 9000 \times 100 \times D$ (R: radius of the fiber; D: specific weight)

According to Table 2-continued in col. 11 of US 6,048,379 as Attachment 1, the polyester-type polyurethane "Texin480A" has a specific weight of 1.2, so that the average diameter of the elastomeric fiber is calculated to be 25.3μm. According to Table 7 in *International Nonwoven Journal*, Vol. 8, No. 1 (1999) as Attachment 2, the polyester has a specific weight of 1.38 so that the average diameter of the nonelastomeric fiber is calculated to be 19.2μm. Therefore, the Bd/Ad ratio in Sisson is about 1.32 (≈25.3/19.2), which is outside of the range of "Bd/Ad≥25/18≈1.39" as Feature 2.

Moreover, Examiner asserted in Page 3 that one of ordinary skill is motivated to reduce the diameters of the fibers in view of Collier. However, Collier merely teaches that the fiber diameters are below 100μm, such as 0.5-50μm, but does not suggest the range of "Bd/Ad≥25/18".

Furthermore, Feature 2 is no obvious modification of the prior art. As mentioned above, the principal function of the nonelastomeric fiber in this invention is to improve the anti-blocking property of elastic nonwoven fabric, and increasing the nonelastomeric-fiber coverage of the elastomeric fiber can improve the anti-blocking property. Since a smaller average diameter (Ad) of the nonelastomeric fibers means a higher relative surface area thereof in the nonwoven fabric, using thinner nonelastomeric fibers can increase coverage of the long elastomeric fiber to result in more effective anti-blocking. Although a low content of the nonelastomeric fiber in the nonwoven fabric generally results in a poor anti-blocking property, this can be compensated for by reducing the average diameter (Ad) of the nonelastomeric fiber.

On the other hand, because Sisson fail to identify the above anti-blocking issue, Sisson has to use two webs of nonelastomeric fibers to sandwich the web of elastomeric fibers for preventing blocking between the elastomeric fibers and other nonwoven fabric.

Since Sisson and Collier both fail to identify the above anti-blocking issue, one of ordinary skill in the art is not motivated to increase the Bd/Ad ratio from 1.32 to a value in the claimed range of "Bd/Ad≥25/18≈1.39" in view of Sisson, or to use nonelastomeric fibers thinner than the elastomeric fibers in view of Collier, even though the very broad range (0.005-200) of Bd/Ad ratio in Collier overlaps with the range of "Bd/Ad≥25/18".

According to MPEP §706.02(j), to establish a *prima facie* case of obviousness, there must be some suggestion or motivation to modify the reference or to combine reference teachings. Moreover, 916F.2d at 682 and USPQ2d at 1432 (*claims directed to apparatus for producing an aerated cementitious composition by drawing air into the cementitious composition by driving the output pump at a capacity greater than the feed rate; the prior art reference taught that the feed means can be run at a variable speed, however the courts found that this does not require that the output pump be run at the claimed speed so that air is drawn into the mixing chamber and is entrained in the ingredients during operation*) taught that although a prior art device "may be capable of" being modified to run the way the apparatus is claimed, there must be a suggestion or motivation in the reference to do so.

Since a motivation or suggestion for Feature **2** is absent in Sisson or Collier or in the generally available knowledge (the correlation between the coverage ration and the anti-blocking effect is

disclosed in this application), a *prima facie* case of obviousness cannot be established for Feature 2 based on the combination of Sisson and Collier.

Furthermore, by including Features 1-2 simultaneously as in claim 1, i.e., by mixing the non-elastomeric fiber and the elastomeric fiber together to form one layer of nonwoven fabric in which the elastomeric fiber is well covered and by using a thinner nonelastomeric fiber to satisfy the above range of "Bd/Ad≥25/18", it is possible to further enhance the anti-blocking effect.

III. Feature 3 (using a melt-blowing or spunbonding method) and Its Non-obviousness

Though Collier teaches to use a melt-blowing method or a spunbonding method, the part in Sisson's disclosure concerning the fiber manufacture is difficult to combine with the corresponding part of Collier to obtain Feature 3, for Collier's fiber manufacturing methods are taught away in Sisson. It is noted that the process limitation of using a melt-blowing method or a spunbonding method causes a structural feature, for the fiber manufacturing method also affects the texture of a nonwoven fabric, as mentioned in the Responses to the previous Office Actions.

According to col. 1, lines 43-64, Sisson's invention is intended to solve the problems of conventional apparatuses and methods that move the filaments from the spinning holes toward the forming surface of the wed via a gas stream so that the positions of the fibers cannot be controlled precisely. According to col. 5, lines 46-62, Sisson's solution is to draw the filaments by one or more draw rolls or belts disposed under the spinning holes to textile denier and then forward the drawn filaments by forwarding means to the forming surface of the web, such that the alignment of each filament can be controlled precisely.

Hence, Sisson teaches away to use the conventional apparatuses and methods (melt-blowing and spunbonding) used in Collier, so Sisson is difficult to combine with Collier in that aspect. Even if Sisson and Collier are purposely combined in the aspect, there is no motivation to replace Sisson's method with a melt-blowing method or a spunbonding method used in Collier to obtain Feature **3**. For at least the above reasons, Feature **3** is non-obvious over the combination of Sisson and Collier according to the aforementioned words in MPEP §2143.01 III. Consequently, the structural feature caused by Feature **3** is also non-obvious over the combination of Sisson and Collier.

For at least the above reasons, Applicants respectfully submit that independent claim 1 having Features **1**, **2** and **3**, independent claim 11 having Features **1** and **3** and independent claim 14 having Features **1** and **3** as well as claims 3-7 and 12-13 dependent from claims 1 and 11 all patently define over the prior art. Applicants also respectfully submit that no experiment is needed to see if an elastic nonwoven fabric of Sisson and Collier makes an elongation recovery rate of 70% or higher after 50% elongation or a separation resistance equal or less than the strength at 50%, because the above Features **1-3** can make the claims non-obvious as well as advantageous over the prior art.

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CONCLUSION

For at least the foregoing reasons, it is believed that claims 1, 3-7 and 11-14 are in proper condition for allowance. If the Examiner believes that a telephone conference would expedite the examination of the above-identified patent application, the Examiner is invited to call the undersigned.

Respectfully submitted,
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